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THE INSTITUTE OF ACTUARIES.

The Second Annual Examination of Candidates for the Institute's Certificate has passed off with no less satisfactory results than the First. The five Associates presenting themselves* having all been declared fully entitled to receive it, after undergoing a somewhat more than ordinarily lengthened ordeal. By the permission of the Council we now lay before our readers that part of the Examination which consisted in written questions. The *vivâ voce* portion of it, however, we are enabled to state, extended over a much wider surface, and was of a much more varied character.

This is the last occasion on which a Certificate will be conceded after one Examination: the Institute having determined that in future "the Examination shall consist of three parts, separated from each other by an interval of at least one year, and that no member shall be eligible for the final one unless he shall be of the full age of 21 years." It must be admitted, we think, that these are wise and wholesome provisions, tending directly to the great object for which the Institute was organized, viz., the elevation of the status and character of the profession. If the labour and anxiety of aspirants are somewhat increased and protracted by these regulations, there is every reason to believe that their reward will be the greater. They will ultimately enjoy a higher degree of public consideration, and they will have the satisfaction of knowing that they have well earned it. As an adjunct to these arrangements, we should see with great pleasure the establishment of one or even two professorships sufficiently well endowed to command the services of men able, not only to lead their followers into the highest paths of the science, but to give them a complete insight into the many important subjects connected with it. With this object attained, and with the institution of two or three annual prizes to stimulate its energies, the machinery of the Institute would be well-nigh complete, and little else than time would be wanting to bring about that stage of its development which would lead at once to the acquisition of more enlarged powers, and to its entering upon a wider sphere of public utility.

Midsummer Examination, 1851.

Examiners. { DAVID JONES, ESQ.
ARTHUR SCRATCHLEY, M.A., F.R.A.S.

First Day, 16*th June.*

1. Find the greatest common divisor of 15, 195, 75, 45, 60.

2. Convert £19. 7*s*. 8*d*. into an expression by decimals.

If £200. 15*s*. 6*d*. will purchase an annuity of £19. 7*s*. 8*d*., what would an annuity of £13. cost?

Explain the correction necessary when an annuity is payable half-yearly.

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* The names of these gentlemen are given in the account of the Proceedings of the Eighth Sessional Meeting of 1851. *Vide* No. IV. of the *Assurance Magazine*, p. 368.

3. Add $\overset{sh.}{\frac{1}{2}}$, $\overset{sh.}{\frac{3}{4}}$, $\overset{sh.}{\frac{5}{8}}$, and $\overset{sh.}{\frac{1}{6}}$, and express the sum in decimals as regards the shillings and pence.

4. Solve the general quadratic equation $x^2+px-a=b$.

5. Give the sum of the following arithmetical series to ten terms, viz., 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and exhibit the general formula for the same.

6. Construct columns D and N according to Mr. Davies's formula.

7. Given—table of mortality, values of annuities, and single and annual premiums of assurance, and the policies classified as regards the sums assured, and the ordinary annual premiums according to the years of birth:—State the process by which the policies should be valued.

8. Give the formulæ for insuring by single and annual premiums an endowment of £100 to a party now aged 20, payable on attaining the age of 50 years, or earlier in the event of death; as also an annuity of £20 for every year the party shall survive the above age.

9. At ages 20 and 30 we have the following data:—$l._{20}=6090$, $l._{30}=5642$, the present value of an annuity on a life aged 30=£19·556, and the present value of £1 due in 10 years =£·744: deduce from those data the present value of a deferred annuity to begin when the life 20 attains 30.

10. Given the present value of an annuity at a given age by a table of mortality at 3 *o/o*=£16. 6*s*. 4*d*.: deduce therefrom the single and annual premium to assure £100 at the end of the year in which the life may die.

Second Day, 18*th June.*

1. Find the least common multiple of the numbers 15, 195, 75, 45, 60.

2. $x^2+px+q=0$ cannot have a fractional real root if p and q are integers.

3. Determine the condition that ax^2+bx+c may be a complete square.

4. How is the value of an expectation determined mathematically?

5. How is the probability of an event happening expressed mathematically, and why is it so expressed?

6. Set down the form of $(a+b)^m$ expanded (m being a positive integer), and, supposing $(1+x+x^2+x^3, \&c.\ x^n)^m$ expanded, how many terms would there be?

7. Define momentaneous interest, and show how the expression $S=P(1+i)^n$ becomes of the form $S=P.e^{in}$ where the interest is momentaneous (e being the base of hyperbolic logarithms).

8. Define briefly an annuity, and obtain the algebraic form of the *present value* of an annuity which is to last n years; interest being calculated at the rate of i per pound.

9. Suppose that P were the *present value* of an annuity in question 8, and that A were the *amount* of the same annuity in n years; prove that $\frac{1}{P}-\frac{1}{A}=i$. Also give the verbal interpretation of that expression.

10. If a sum, P, be deposited by a life aged m years in an Assurance Office, to bear yearly interest after the rate of i per pound, which is to go by way of premium to effect an assurance on the depositor's life; and if the office annual premium at that age be π for the assurance of £1, then find

the amount of money, including P, which would be payable in case of death to the depositor's family.

11. If $x+c$ is a common measure of two quantities, x^2+ax+b, $x^2+a'x+b'$; show that their least common multiple is $(x+c)$ $(x-c+a)$ $(x-c+a')$, and show the relation between a, b, a', b', that the assumption of $x+c$ having been a common measure may hold.

12. Define the principle of logarithmic tables, and prove that if

$$\left.\begin{array}{l} y=e^{\frac{1}{1-\log._e x}} \\ z=e^{\frac{1}{1-\log._e y}} \end{array}\right\}$$

then

$$x=e^{\frac{1}{1-\log._e z}}$$

13. How many trials would it be necessary to make, that it might be an even bet, that an event (whose probability is represented by $\frac{a}{a+b}$) would happen?

14. A coin has been thrown up four times, and heads have turned up each time: what is the probability of the same occurring 20 times more in succession, supposing head equally probable as the reverse?

15. Tables are given for the *amounts* and *present values* of term-certain annuities payable at the *end* of each year: show how from them can at once be extracted the corresponding *amounts* and *present values* for annuities payable at the *beginning* of each year.

16. In the case of terms certain, a sum, P, is borrowed, and a certain annuity, a, is set aside by the borrower after the third year to repay principal and interest at the rate of interest i per pound. Determine the number of years in which it would be repaid.

As a fitting pendant to the above we insert portions of Mr. Porter's solutions, mentioned in No. III. of this Magazine (*vide* p. 268). We regret that our space will not admit of our doing more: and we take the opportunity to add, that we cannot undertake to give insertion to solutions of the questions now made public.

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6. Explain Barrett's method, as modified by Griffith Davies, for the construction of annuity tables.

In answering this question we may at once assume that

$$a_m=p_{m1}.r+p_{m2}.r^2+p_{m3}.r^3+\ \ldots\ldots\ \mathrm{P}_{mz}.r^z.$$

z being the difference between the age m, and the oldest age in the tables, pm_n being the probability of a life aged m years living n years, and $=\frac{l_{m+n}}{l_m}$, and we have

$$a_m=\frac{l_{m+1}.r+l_{m+2}.r^2+l_{m+3}.r^3+\ \ldots\ldots\ l_{m+z}.r^z.}{l_m}$$

Multiplying numerator and denominator by r^m, the expression becomes

$$a_m = \frac{l_{m+1} \, . \, r^{m+1} + l_{m+2} \, . \, r^{m+2} + \ldots\ldots l_{m+z} \, . \, r^{m+z}}{l_m \, . \, r^m} = \frac{\mathrm{N}}{\mathrm{D}}.$$

By taking a numerical example we better see the advantage of this process, —say $a=96$. Then

$$\frac{l_{96} \, . \, r^{96} + l_{97} \, . \, r^{97} + l_{98} \, . \, r^{98} + \ldots\ldots l_{104} \, . \, r^{104}}{l_{95} \, . \, r^{95}}.$$

Here we see that in finding the value of an annuity at the next lower age, say $a=95$, every term is included that was employed in finding a_{96}, and a great amount of labour is thereby saved.

In Mr. Griffith Davies's modification of Barrett's method, the numerator of the above fraction is the number in column N against the given age, and the denominator that in column D.

7. Obtain expressions by the ordinary methods for the single and annual premiums for a deferred life annuity.

The first year's payment of an annuity deferred n years will be receivable at the expiration of $n+1$ years, if the life be then in existence. Hence we have the series—

$$\frac{l_{m+n+1} \, . \, r^{n+1} + l_{m+n+2} \, . \, r^{n+2} + \ldots\ldots l_{m+n+z} \, . \, r^{n+z}}{l_m}.$$

Multiplying numerator and denominator by r^m, we have

$$\frac{l_{m+n+1} \, . \, r^{m+n+1} + l_{m+n+2} \, . \, r^{m+n+2} + \ldots\ldots l_{m+n+z} \, . \, r^{m+n+z}}{l_m \, . \, r^m}.$$

Now the numerator of this fraction is the number in column N for the age $m+n$, and the denominator is the number in column D as before.

To obtain the annual premium we have only to divide the single premium by the temporary annuity for n years.

$$\frac{\dfrac{\mathrm{N}_{m+n}}{\mathrm{D}_m}}{\dfrac{\mathrm{N}_m - \mathrm{N}_{m+n}}{\mathrm{D}_m}} = \frac{\mathrm{N}_{m+n}}{\mathrm{N}_m - \mathrm{N}_{m+n}};$$

and if the 1st of the n payments is immediate,

$$\frac{\mathrm{N}_{m+n}}{\mathrm{N}_{m-1} - \mathrm{N}_{m+n-1}}.$$

10. The premium to assure £100 to be received on the decease of the first of three lives, A, B, and C, each aged 20, being £5. 10*s*., what should be the annual premium to assure £250 to be received in the event of A dying, leaving B and C him surviving?

The ages of the three given lives A, B, and C, being each 20, it is of course an even chance which dies first; the chance, therefore, of A dying leaving B and C surviving is exactly $\frac{1}{3}$, and $\frac{1}{3}$ of £5. 10*s*., or £1. 16*s*. 8*d*., is the annual premium for the assurance of £100 on the required contingency, and the premium for the assurance of £250 is therefore £4. 11*s*. 8*d*.

18. Give a brief description of the method of double entry, and show how the books of a Company kept upon such method may be made to furnish a complete account of the state of its affairs.

The importance of book-keeping (an art too much neglected by many Assurance Companies, if we may judge by the specimens of balance-sheets furnished to the Registrar of Joint Stock Companies under the Act 7 & 8 Vict., cap. 110) is acknowledged even by that eminent mathematician Professor De Morgan, who has considered the subject worthy of a chapter in the last edition of his "Elements of Arithmetic," (5th Edit., Appendix VII.,) and which the student will do well to consult.

A well-kept set of books should afford the means of knowing—

1. The state of the affairs of the Company at any given time.
2. The state of its affairs at any other given time.
3. How the latter state was arrived at.

All accounts of any importance are invariably kept by what is termed "Double Entry," the main feature of which is that every transaction "credited" to one account is "debited" to another.

Thus, for example, when an amount of premium is received by an Assurance Company, the cash account is debited with the amount received, and the premium account credited with the same, or, in technical terms, "cash" is made "debtor to premiums," and premiums "creditor by cash;" the amounts of the debtor and creditor entries are therefore always equal.

I have been favored by Mr. Jellicoe, the Actuary of the Eagle Insurance Company, with his notes of a lecture on the "Principles and Philosophy of Account Keeping," read before the Institute of Actuaries, from which I make the following extracts:—

Speaking of the system of double entry, that gentlemen says, "If, then, we have to construct a system of accounts upon this principle, we have first to consider the things which we wish to take account of, and the persons whom we have to keep account with; the names of these things and persons forming the title to the several accounts to be 'opened,' as is technically said in the Ledger." . . . "The person or thing named at the head of the account is indebted to the concern to the amount standing on the left side of the folio, whilst the concern is indebted to him or it to the extent shown on the opposite side." . . . "The entries in these accounts answering to the operations of each day may be carried on continuously by the aid of what is called the Journal, which in fact stands in the relation of an index to the Ledger."

To make an investigation of the state of the affairs of the Company, the first step is to ascertain the amount of balance standing on each particular account, to dispose of which an intermediate account must be created; this is usually called the "Profit and Loss Account." Mr. Jellicoe, in objecting to this term, says:—"In life assurance matters there is no determination of profit and loss except at certain intervals,"—referring of course to the periods of the valuation of the liabilities of the Company; and adds, "in the absence of this determination, such a title is evidently a misnomer."

Mr. Jellicoe recommends, as a title for this particular account in assurance business, that of "Income and Outgoing." The transfers from one account to another are made by means of entries in the journal.

The balance of this account has again to be transferred to an account the title of which varies in different establishments, and is called indifferently "Stock," "Assets," &c. Mr. Jellicoe prefers that of "The Rest," taken in the sense of the remainder. This term is the one adopted by the Bank of England.

The balances being again extracted, "the debtor side represents the total amount of assets, out of which have to be taken the real debts on the creditor side; and what remains after this deduction, or 'The Rest,' constitutes the Company's actual property."

This statement is called the "Balance Sheet," or "Balance Account," and shows the state of the affairs of the Company at the given time; while the account called "The Rest" shows how that state was arrived at.

The articles on "Book-keeping" in the *Penny Cyclopædia*, and in McCulloch's *Commercial Dictionary*, may be consulted with advantage.

Alliance Assurance Office. H. W. PORTER.

We now complete the account of the Proceedings at the General Meeting of July 1851, by insertion of the Appendices C and D, referred to at p. 379 of Number IV.

APPENDIX C.

Paper presented by Mr. Samuel Brown, one of the Honorary Secretaries of the Institute of Actuaries, On the Collections of Data in various branches of Assurance.

It may seem strange that, after the business of Life Assurance has been conducted in this country by large and influential Companies for nearly 90 years, Fire Assurance for upwards of 150, and Marine Assurance for a still longer period, we should now propose for discussion what are the collections of facts on which our Tables are based, and where better information can be procured than that which we now possess. Yet I believe there is no one who has given attention to this subject, who has not felt that the science of assurance is very much in advance of our practical knowledge. The doctrines of probability have been taken up as an interesting study by the first mathematicians of Europe. Such names as Pascal, Huygens, Bernoulli, Demoivre, Euler, Laplace, and in the present day, De Morgan, who has done so much to bring the results of the most profound analysis within the reach of the younger student, may indicate to what extent the theory of probability has been investigated. But the difficulty of applying the theory to practice is as great as ever, and requires that another body of labourers in a more humble sphere should exert themselves to collect data, and to draw from them conclusions which the pure theorist may suggest, but would never be safe in assuming as strictly in accordance with facts, so varied are the subjects to which, and the circumstances under which, his mathematical reasonings may be applied.

We propose, therefore, to give a hasty glance at the different collections of facts on which the business of assurance in its various branches in this country depends; and to take advantage of the happy circumstance which has brought together from all parts of the world men of science, of general intelligence, of liberal views, and enlightened minds, to compare notes of our relative knowledge, and to profit by each other's advance on subjects so important. Happy shall we be if an intellectual intercourse so auspiciously commenced, shall lead to a continued and friendly interchange of thought and the results of experience. The "World's Fair" may then leave some permanent traces of its benefits in the moral and social improvement of different countries—an improvement which it is admitted by all writers on political economy, that the subjects to which the members of this Institute, and those visitors by whose presence they are honoured this day, have devoted themselves, are calculated to produce. Without further preface, I proceed to consider the collection of facts which have been formed into tables, and are in use by Assurance Companies in their various branches of business.

I. In those relating to Life Assurance and Annuities.

1. *General Assurance.*—The Northampton Table was adopted by the Equitable Society at a time when they had been previously using the London Table of observation, and which from the experience of 12 years, 1768 to 1780, having given high profits by the comparative low rate of mortality in the society, they had determined to make such abatements in their demands as present circumstances rendered safe. Dr. Price states generally that he had expressed his wishes "that the Society would order new tables to be calculated from observations more adapted to the general state of mortality among mankind, than those given by the London Bills of Mortality." For this purpose he recommended the observations on human mortality at Chester, and had procured a copy of them from Dr. Haygarth; but the director of the Society judged that they carried the probabilities of life too high for their business, and the rates deduced from the Northampton Table were selected in 1782. Dr. Price alludes to the profit which the use of this Table would afford to the members, and states that it differs but little from the Breslau, which gives probabilities of living nearly a third lower than those which have hitherto taken place in the Society. He believed that the Society might safely trust itself to these advantages, and make no extra charge upon the premiums; which, nevertheless, the caution of the directors then thought necessary to retain. He even went so far as to say, that perhaps in time the Society might find itself capable of reducing the payments for assurances even below those in the Table alluded to. Without going into the controverted points, whether a Society should confine itself strictly to the rates, which its actual experience would render necessary, or should use such tables as would lead to the reasonable profits or accumulations which nearly all assurers now look for, there can be no doubt that at that time the prudence and care which the directors of the Equitable Society exercised in the diminution of the premiums, and their determination to err, if at all, on the safe side, led to the vast extension of the blessings and advantages which the practice of Life Assurance in this country has caused. Had they adopted a contrary course, and had they reduced their premiums (as is now too frequently the case) to little more than the rates which their earlier experience would have shown necessary, to what a condition, we might ask, would the Society have been reduced at the present time, and where would have been that multitude of Companies which have profited by the success of the Equitable? and whilst they expose the errors of the Northampton Table they are obliged to adopt some other which in actual practice differs very little from it at the average age of assuring.

The Northampton Table is still used by twelve or thirteen Offices. The principal objection made against the use of it is that it does not represent the actual mortality of a community or society; but exhibits a rate too high at the younger ages, and too low at the older. A few of the offices have attempted to correct this presumed error by using rates calculated from the Carlisle Table at 4 per cent., with 40 per cent. added at each age. The comparison may be made as follows:—

	Aged 20.			Aged 30.			Aged 40.			Aged 50.			Aged 60.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Northampton	2	3	7	2	13	5	3	7	11	4	10	8	6	7	4
Carlisle (4 per cent., 40 per cent added)	1	16	11	2	9	2	3	6	6	4	14	2	7	14	11
Experience of 17 Offices (3 per cent., 25 per cent added)	1	16	10	2	7	8	3	5	2	4	15	11	7	10	8

The last line represents the premiums deduced from the experience of 17 Life Assurance Offices. The original table of observations at 3 per cent. differs very little from one at the same rates for these ages, deduced from Mr. Arthur Morgan's Table of the Experience of the Equitable Society, from September 1762 to 1st January 1829, printed in 1834.

The principal objection made by many actuaries to the Northampton Table is, as stated above, that it is not founded on the actual mortality of the assured. It is contended, that the only correct principle is to employ a table representing the *real* rate of mortality and the *real* rate of interest; and then to make such addition by way of per centage thereto for profits, and such further annual payments for expenses, as may be considered advisable under the conditions and expectations which the office holds out. This leads us to consider the collection of facts which the offices themselves have furnished. The only observations derived from actual experience, which can at present be considered of any value for general Life Assurance purposes, are—

1. Those of the Equitable Society, above referred to. They were printed for the use of the members by Mr. Arthur Morgan, the distinguished actuary of the Society, in such a form as to afford materials for many curious and useful deductions. The total number of lives assured during the period was 21,398, of whom 6,930 were living on the 1st January, 1829; 9,324 had ceased to be members by the surrender, forfeiture, or discontinuance of their last policy; and 5,144 had died. The assured had enjoyed amongst them 266,872 years of life, and one with another had been members of the Society about 12¼ years. The annual mortality had then been 1·96 per cent. The most remarkable facts deduced from this table were those showing the effect of selection of lives for assurance, a great increase of mortality being observed amongst those of the same age in proportion as they had been members 5, 10, 15, 20, &c. years. Mr. Morgan points out this result in a small table given in the preface. The same subject has been examined with great care by Mr. Edmonds in the *Lancet*, in 1837 and 1842; by Mr. Farren, who gives a comparison of the mortality at each age in the first year of selection, with the general mortality in England at large; and by Mr. Higham, who in a paper read before the Institute of Actuaries, and published in the third number of the *Assurance Magazine*, has formed tables both of Expectation and of Annuities at 3 and 3½ per cent. for lives assured at different ages. In a little work, which appeared in 1849, I pointed out the importance of these observations in estimating the liabilities to rapidly increasing claims, which almost every Life Assurance Company may expect after an existence of thirty or forty years. I believe that the warning then given is of still greater importance now, when so many new Companies are formed with the flattering notion that premiums may be greatly reduced, expenses greatly increased, and yet that no great diminution of profits need be anticipated.

The publication of a few more years of the Equitable experience would be most invaluable; and the public, who have already derived so much advantage from the talents of Mr. Morgan and the liberality of the directors, might be benefited to a still greater extent by being saved from the consequences of reasoning, from insufficient data, on a subject on which a longer experience may greatly modify former conclusions.

2. The Tables deduced from the experience of the Amicable Society were also printed for the use of the members, under the care of Mr. Galloway, the registrar of the Society, in 1841. They were divided into two classes of the members,—those assured before and since 1808. This distinction is especially valuable, as not merely confirming the previous observations, but as showing, amongst the older class, the mortality of a society in which nearly all the members had become extinct; less than 6 per cent. of those who were living in 1808 remaining alive at the date of observation. The number of lives assured at that time was 1,088; more than half were above the age of 57, and the same proportion had then been members of the Society more than 11 years. The duration of membership of these lives from 1808 to 1841 had been 14·1 years, and the average mortality had been 6·04 per cent. per annum. The combina-

tion of the two classes shows a mean duration of life, at nearly all ages, less than than that of the Equitable Society, especially between the ages 40 to 60; and above the age of 55 to near 80, less than that of the Northampton Table. The Amicable Society, I believe, now uses its own experience table, with proper corrections, and a fresh investigation is made every 10 years,—a very laudable practice, which ought to be followed by every Life Assurance Society wherever established.

3. The Table deduced from the combined experience of 17 Life Assurance Companies. This table, prepared in 1841, though much credit is due for the labour gratuitously given, and the observations so liberally supplied by the Offices, is subject to several disadvantages. The observations, in many of the Companies, refer only to policies; whereas in the general results they are mixed up with those of the Equitable and Amicable Societies, which relate only to lives. Policies may be dropped for various causes in a much more irregular manner than lives may fail; they may also be more numerous in proportion to the lives in some Offices, by the prevailing practice of subdividing sums assured to increase the number of new policies effected in the year; and at the termination of life, several policies falling in with one or two lives may give the appearance of an unusual mortality which may not really be the case. I would therefore venture strongly to recommend, that whenever the actuary proposes to form a table of mortality from the experience of his Company, he should confine himself exclusively to lives. The observations in the actuaries' table are restricted, in the cases even of longest duration, to the first 23 years of the existence of the Companies, and they are therefore deficient in that point for which the Equitable and Amicable Tables are so valuable; viz., as showing the increase of mortality after many years of membership. In other respects they are admirably arranged; and it is to be hoped will not only be continued to a more recent period, but form models of imitation for other Companies to follow. The total number of policies, in which the sexes were distinguished, was 40,616, of which 25,462 were in existence at the date of observation; 11,226 had been discontinued, and 3,928 had become claims by death. The average duration of each policy had at this time only been 5½ years. The proportion of deaths was 1,000 where they would have been 907 by the Carlisle Table, and 954 by Davies' Equitable Experience, out of the same number living. The proportion of female lives was 10·3 per cent. Some unexpected results are found in the conclusions to be drawn from these observations: 1st, that the mortality at all ages in towns was less than in the country assurances; 2nd, that the mortality amongst assured females was greater than amongst males.

In alluding to collections of facts to be drawn from the records of Assurance Companies, it would be unjust to pass over the very complete manner in which the data of the Gotha Life Assurance Company are given in the Reports by Herr Hopf, and which have enabled Mr. Neison to make a very complete and curious analysis of the results for the 20 years 1829 to 1849, not merely as regards the mortality, but the periods of the year in which the deaths took place, the nature of the diseases, and their intensity at different periods of life. As the Gotha Office is as to numbers the largest in the world, having assured 22,063 lives in 21 years, and 15,671 remaining alive at the beginning of 1850, the value of these observations may be recognized. If every Office had published accounts of their risks so complete as this in all parts of the world, what curious and useful inquiries might have been made as to the effects of climate, occupation, or manners of life, on the question so important to the Offices in a monetary point of view as that of the mortality of the assured.

I may remark on this subject that Professor Gill, of New York, has in some measure carried out these views, by showing the mortality amongst the members of the Mutual Life Assurance Company of New York, assured by 9,308 policies in the 8 years 1843 to 1851. He divided the classes of members according to place of residence,—a most important distinction in the uncertainty that at present attaches to our knowledge of Life Assurance risks in America,—and came to the conclusion that none of the extra-premiums could be considered as having contributed to the profits of the Society; and that as to California, the mortality had been six times as great as it should have been according to their ordinary table.

It would be very desirable that some general and uniform method of keeping the requisite data to form tables, so that simplicity might be gained and labour saved, should be adopted both amongst the actuaries of Great Britain and by those foreign managers of Companies who, with materials constantly increasing, may be desirous of opening their storehouses of information to the student in these difficult researches. It is probably this difficulty, rather than any dislike to make public what cannot but be for the benefit of all, which prevents the English actuaries from comparing their experience more frequently, and it becomes a point of greater consequence where, as we expect, the liberal feeling on the Continent towards us may before long lead to mutual cooperation in labours so useful to society, and so honourable.

Two most important censuses recently taken, that of Great Britain and that of the United States of America, will probably furnish to the actuary matters for inquiry and reflection, such as have been nowhere obtained before. The real abilities and experience of both Mr. Farr and Mr. Kennedy will be a warrant to the world that the labours of these gentlemen will not end in idle results, but that subjects of the utmost and daily increasing importance to society will be investigated in a manner they deserve.

We must pass over other remarks on collections of facts for different purposes connected with life assurance used in this country, such as Finlaison's Government Table for Life Annuities; and, as to the mortality in different occupations and trades, the remarkable tables in Mr. Neison's Contributions to Vital Statistics, confirmed as they have since been by the publication of Mr. Radcliffe on the mortality at all ages in different occupations, from the records of the Odd Fellows' Society. The observations for the last five years, recently collected, according to the Act of Parliament, from the different Friendly Societies in England by Mr. Tidd Pratt, the Registrar, and comprising upwards of 336,000 perfect returns, will probably in a short time be arranged in a form to throw new light on this interesting subject. It is one that peculiarly affects the working classes of England, and it is to be hoped will lead to much reform, and save many of these well-intended clubs from the deplorable and bankrupt condition to which they are now reduced. The earlier Tables of Dr. Price and the Rev. Mr. Becher, as to the rates of allowance for sickness, have been almost superseded by more recent collections of facts; but the above-mentioned returns will on this topic be of the utmost value, whether they confirm or disprove existing conclusions, as being the largest number of most authentic returns yet made known.

The question of the assurance of Diseased Lives is almost a novelty. The facts are yet to be sought for in the records of the Offices which have lately undertaken this class of risks. Some observations of this kind have been given in the Registrar General's Reports, and others in various Medical Journals; but they are all wanting in that minuteness of inquiry and careful classification which are found where there exists a strong motive for careful selection, and the power of requiring all the facts to be stated. The paper read before this Institute by Mr. Pinckard will open the subject. In a few years, if published, the additional observations in his and the other Offices will be far superior to the Government returns of deaths by various classes of disease.

Another subject on which we are at present very deficient in data is that of Risks of Life in Foreign Climates. Colonel Tulloch, in his able Reports on the Sanitary Condition of the Army stationed in different Foreign possessions of Great Britain, first threw new light on this question. The Reports of Mr. Griffith Davies on the Medical and Military Funds of India; Mr. Woolhouse in his Table of Indian Mortality; and the paper by Mr. Jellicoe on the Rates of Premium to be charged on the Lives of Military Officers serving in India, are all valuable to consult. The last also contains a complete set of tables for the usual Office calculations. Mr. Neison has collected the most complete set of observations from the records of the India House which has yet been made, tracing the mortality both amongst the military and civilians, their wives and widows, male and female children, &c. If these data would pay the expense of publication, it would be worthy of Mr. Neison's active and liberal mind to make them public. In the meantime the use of them has been most generously offered to the members of the Institute,—a privilege which, I can speak from personal experience, does not exist in words only, but is acknowledged as gratefully as it was granted freely.

In these remarks, time only allows me to confine myself to the mere enumeration of our principal collections of data in England. I understand that in France the Table of Duvillard is generally used for the calculations relating to assurance of reversions, and that of Deparcieux for those relating to annuities. The former appeared in Duvillard's treatise on the influence of the small-pox on mortality at different ages, in 1806. An abridgment of this Table will be found in Milne, vol. ii., p. 574, and that of Deparcieux follows it. It was constructed from the mortality amongst nominees of the Tontines in France, from 1696 to 1742. The Tables of M. Quetelet, founded upon the statistical returns of the whole of Belgium for 3 years, and published in 1832, are worthy of remark, as showing the difference between male and female lives, both in town and country.

The following comparison may be made as to the expectations of life :—

	Aged 30.	Aged 40.	Aged 50.
Duvillard	28·5	22·9	17·2
Deparcieux, Tontines	34·1	27·5	20·4
Quetelet, Town	32·	25·8	19·5
„ Cantons Males	33·	26·	19·1
„ Cantons Females	31·5	25·9	20·

In Germany a very complete Table, both for male and female lives, was formed by Herr Brune, of Berlin, in 1837, and printed in the Journal of Assurance published at Leipsic by Masius, from the observations of the Prussian Society for making a Provision for Widows. The observations extend from 1776 to 1834, and are continued in Masius to 1845. The former period comprises observations over 31,500 marriages. The tables show a mean duration of life considerably less than the English Government Tables, either for male or female life.

We should be glad on these subjects to have the opinions of our foreign friends, if any other data have been collected on good authority.

Fire Assurances.—It will be seen from the above remarks that considerable attention has been paid to the collection of facts relating to the duration of human life. But as to observations on the risks of Fire Insurance, no authentic information has been made public by any of the Companies, notwithstanding the large number of observations which must exist in their books. An article in the *Assurance Magazine* was probably the first attempt made to bring together the cases of fire which had occurred in London in a form from which any general conclusions could be drawn. In doing so the defects of our knowledge became still more apparent. This is probably the first step to improvement. It is supposed that there are difficulties in the way of a classification of risks, according to what would appear the natural subdivision of them, namely, the greater or less hazard of the trades carried on in different buildings, or the greater or less liability of certain localities under the heads of these different trades, which would make any just estimation of them nearly impossible. It appears to me, however, that we must not despair, for in the first instance still greater difficulties would exist in procuring data as regards health and longevity. The short period for which Fire Assurances may be made would in the long run be balanced in the experience of the Companies, either by the multitude of risks, or, what would probably be a still more useful result, by the longer duration of the contracts. There would seem to be *à priori* no adequate reason why the value of an insurance against sickness during life should be a more easy calculation than the chance of a fire during a life. If attacks of sickness always followed the advance to old age we might see no comparison; but epidemics may attack young and old, the weak and the vigorous; yet we endeavour to classify all these events in minute subdivisions of locality and occupation. Accidents to life or limb may happen from the carelessness of individuals themselves, or the wilful injuries of others; yet we arrange these under their separate causes. Frauds may be possible in all cases; but crime is the exception to the general morality of a country. The probable occurrence even of crime, so far as it affects attempts upon the property of others, has been gradually reduced to some general laws, the effects of which are capable of calculation; and such as affect the destruction of property are even still more deserving of a close investigation, the facts of which are possessed by the Insurance Companies. The classification and combining of many thousand facts might, however, prove sufficiently laborious to render desirable only at first a rough estimate of the losses in various classes of risk by fire. For this purpose it would be sufficient to assume that the premiums actually taken show the extreme of risk arising from the combination of dangers resulting from the different causes, which the experience of the valuer is called upon to assess. It is true, that in this way the relative skill and practice of the assessor becomes an element of the valuation; but this may be neglected in the first general collection of facts. The risks might therefore be classified under the different rates of premium paid per cent. from 1 per 1000 to 1 per cent., and the actual amount ascertained as lost under each class in per centage of amount insured. The inquiry thus commenced would probably be found sufficiently interesting in the results to be more minutely pursued. It is almost impossible to refer to the subject of Fire Insurance without making some allusion to the unjust and oppressive tax which weighs so heavily in this country on the prudence and economy of the people. That luxury and extravagance, the idle indulgences of wealth, or temptations to vice, should be repressed by the load of taxation, is what almost every one would be prepared to admit: we might even applaud the minister who made the necessities of the state an encouragement to order and morality; but that the desire to preserve the wealth of individuals, which is that of the country, from being suddenly destroyed; to equalize losses by a system which maintains a steady growth of prosperity, and averts the disastrous effects of great and unexpected calamities which generally extend beyond the more immediate sufferer; to save the shocks to public credit which unexpected reverses even to a few individuals may sometimes cause, should be checked by so heavy a tax, seems contrary to all the maxims of political and social wisdom. That the burden should be borne with so much patience for so many years, when we have thrown off so many taxes far less injurious to the public interest, is one of those curious anomalies difficult to explain; but it is a burden unequally distributed, which time, so far from reconciling us to, only tends to prove the injustice of. The duty may in fact be considered as a government tax, of more than one million sterling, on the virtues of prudence, economy, and self-denial, and, what is worse, it increases with their exercise.

Maritime Insurance.—The same vagueness and uncertainty of information exists as to the actual risks of maritime insurance. The knowledge and experience of the underwriters have for many years been sufficient to carry on with great success the large business (probably exceeding that of life assurance) connected with this branch, and to afford considerable profits both to the private assurers and to the influential Companies engaged in it. But as a subject of statistical inquiry, no collection of facts has ever been made on a scale commensurate with its importance. Several valuable observations of the kind referred to are scattered through the little work published by Captain Lafond, the able Manager of L'Union des Ports, one of the principal French Maritime Assurance Companies, and shortly to be republished with notes and tables, bringing down the information to the present time. It is entitled "Guide de l'Assureur et de l'Assuré en Matière d'Assurances Maritimes." Besides a comparison of the conditions of policies issued at different places, it contains remarks on the months in which the greatest danger is incurred in certain voyages, the average number of days then occupied in voyages from one port to another, the premiums required in various places, and the outlines of books necessary for registering the risks and carrying on the business. But of these heads, the only one with which we are at present concerned is the third, the duration of the risk being of course essential in estimating its real value. The changes within the last few years in the average length of voyages to various places, and the general introduction of steam navigation, must have rendered former information on this head almost valueless at present. On another subject, that of collision, a collection of facts was formed by Mr. Rucker, Underwriter to the Corporation of the London Assurance, for the years 1845 to 1849, which attracted greater attention at the time from being noticed in the City article of the *Times*. Some novel results, deduced from the classification of 3064 of these observations, will be found in the first number of the *Assurance Magazine;* and, in the third and fourth numbers, a few facts relating to maritime casualties during short periods in the navigation of the Thames, and in the St. George's and Liverpool Channels. Notwithstanding the many thousand particulars which must be annually recorded, these form the few and meagre collections which have been made public, from which any light may be thrown on the actual risks, involving nevertheless so large an amount of property, and producing an annual revenue probably, at least, equal to that derived from Fire Insurance. It is true that the comparison of facts may not enable the underwriter to fix the exact premium for any individual risk, any more than life tables will show the exact duration of any individual life; but the causes which lead to excess of danger at particular seasons, on certain voyages, and to a given class of vessels, can never be well ascertained except by actually bringing together a multitude of cases classified under the heads to which inquiry is directed. The practical conclusions of the individual assurer thus become proved or disproved by the experience of many others; and the insurance even of great, and sometimes wholly rejected risks may be rendered safe at an adequate premium, the amount of which can in no other way be correctly computed. The sources for these inquiries would no doubt be the information recorded in *Lloyds' Lists* and *Shipping Register*, and the similar *Bureau Veritas* of the French underwriters, *Registre de Renseignments sur Navires.* By the authority given by the ordonnance of 1833 to the French consuls, vice-consuls, and consular agents in different ports abroad to obtain from the captains of vessels the particulars of their voyage from the last port, so far as concerns any cause of delay, any accident or damage to the ship or cargo in this interval, —and if a shipwreck or collision has occurred, the particulars thereof, the place where it occurred, the amount of injury sustained, the number of lives lost, &c. —another source of correct observation is opened up, provided that some general form was distributed to them in which the particulars should be given under different heads, so as to be readily brought together when transmitted home. The returns, when they are completed, to Mr. Joseph Hume's motion for the number of lives and amount of property lost at sea, will probably furnish some new and useful information, and, if sufficient particulars are given, may lead to many results not contemplated in the original subject of inquiry.

Other Classes of Assurance.—In late years attention has been directed to several other questions important to society, but on some of which it is to be feared that those who first venture upon them will have to correct their original rates by their own dear-bought experience, the facts being too few, or collected by persons too unskilled in the compilation of them, to form trustworthy grounds for action. The risks of hail, of the loss of cattle and horses, and other agricultural stock, of accidents by railway, of guarantee of fidelity, &c., have not been long the objects of commercial enterprise in Great Britain. The two first-mentioned classes have no doubt by this time received considerable elucidation from the history both of the successful and unsuccessful Companies in England and abroad. The large amount insured against hail in Germany and the south of France would, as matters of statistics, afford some interesting results from the books of the Companies, but of course not available elsewhere, from the peculiar local character of this class of risks. In one Company in England the number of agreements for the insurance of cattle, horses, &c., in little more than 5 years to the end of 1850, is given as 40,000, affording a fair commencement for subsequent observation. In the assurance of railway accidents' risks, one Company has issued, in the 6 months ending 30 June last, 2420 periodical tickets, 1838 excursion tickets, and nearly 118,000 single journey tickets. As a proof of the difficulty of obtaining correct information on these newly-assured risks, it was stated by the Chairman at the meeting, that "at the commencement they had no satisfactory data to proceed upon, with the exception of some parliamentary documents, apparently accurate, but which their experience had shown to be utterly valueless. On the faith of these documents however they had contracted a number of heavy liabilities, which he was happy to say would all expire in the course of a few weeks, and which, in consequence of the changes they had made, could not occur again. These changes had been suggested by the facts which they had purchased for themselves in the dear school of experience."

In conclusion, I would beg to draw the attention of the actuaries and managers of Companies, and especially those who are about to commence some new enterprise or mode of assurance, to the establishment from the outset of a register of facts from which the real risk may be ascertained. The same form should be used by all the different Companies, and some method might then be devised of bringing periodically together a multitude of observations from various quarters, without exposing more than may be desired the internal condition or the pecuniary affairs of the Companies. I am persuaded that many of the liberal-minded and scientific men who are connected with these great enterprises would readily unite in objects which are not only of general interest, but peculiarly important to themselves, if it were not that the labour of extracting from books not intended for these purposes appears too heavy to undertake, and the time of their assistants too much occupied to be employed in collecting data omitted to be arranged at the time. But with a simple and general form, begun on the establishment of an Office, and carried on from month to month or year to year, a very slight addition to the ordinary labour would be required, and the mere copying of the form would then suffice to enable a vast quantity of scattered materials to be combined and published for the general information of the Offices, without distinguishing the relative position of each. It might possibly be objected that this would be to make common the experience which some have purchased dearly, and enable others to share in the profit without contributing to the cost. It seems to me, however, that the success of Companies does not depend so much on keeping secret their real experience, as on the skill and management with which the business is carried on and extended. If Companies are highly successful, and the rates of premium are published. nothing could prevent a speculative rival from adopting little lower rates, and entering into a formidable competition on the ground that they should be contented with little lower profits. Nor would there be any limit to this kind of competition, unless the older Company could point out forcibly that their rival was actually offering to do business with premiums which would not meet the real risks, even with the most moderate allowance for expenses,—to say nothing of the greatly increased charges which competition renders necessary. I believe that many share in my fears, that in life assurance at least we are rapidly advancing to this deplorable condition. I believe the publication of the real experience, not of a few recent Companies, but of those which by age and position can show by the results what new Companies must look for and provide against hereafter, would be one of the most effectual means of averting this impending danger. Competition must always be expected in every branch of business where profits can be obtained; but assurance is not like an article of manufacture, of which, by the aid of capital and machinery, we can scarcely see the limit to which the cost of production can be reduced. The rate of mortality is a law of nature; and were the Companies, by laying out more capital in their expenses, to increase their business to any extent, they would not be able to vary the consequences of this law one iota. Let the premiums once come below the actual risks and the expenses combined, and every addition to the business is a fatal and irretrievable loss,—every new policy a fresh step to ruin. It is therefore of the utmost consequence in all branches of our business to know, not from conjecture, but actual facts, how far we can go, and where our safety ends. In being able, too, to speak decidedly and from authority on such a point, the public will not only be benefited to a vast extent, but will be prepared to give their full confidence to the system of assurance generally, and be willing to avail themselves of it with increasing eagerness. The simplicity with which the system can be explained when no mystery is made of the grounds of our confidence; the real advantages which can be held out when an appeal to facts will prove that they are not merely the hopes of a few sanguine speculators; the improvements to which the discovery of new laws or the correction of former theories may give rise; and finally, the field which will be thus opened up for new and extensive operations all over the world, may be considered as strong reasons for the combined efforts of the actuaries of Great Britain and all foreign countries, in bringing together the results of their past experience for their guidance in the future.

APPENDIX D.

A Summary of the Assurance business of Great Britain and other Countries. Paper presented to the Meeting by Mr. Samuel Brown, F.S.S., one of the Honorary Secretaries of the Institute of Actuaries.

Great Britain.—*Life.*—With regard to the Life Assurance Companies of Great Britain, very little information exists in a collected form, so as to ascertain the total amount assured. In the course of some inquiries on the subject, I have been favoured by a friend with the following approximation, which probably very nearly represents the total in this branch of business at a recent period.

1849.

RETURN OF STAMPS ON LIFE POLICIES.							APPROXIMATE COMPUTATION FROM PRECEDING RETURN.		
Sum insured covered by the Stamp.	**Amount of Stamp.**			**Value received for Stamps in the year.**			**Number of Policies.**	**Assumed Average Sum insured.**	**Aggregate Sum insured under each Class of Stamps.**
	£.	*s.*	*d.*	£.	*s.*	*d.*		£.	£.
Under £50	0	2	6	177	2	6	1,417	40	56,680
£50 to £100	0	5	0	1,915	5	0	7,661	80	612,880
Under £500........	1	0	0	10,627	0	0	10,627	300	3,188,100
£500 to £1,000	2	0	0	8,910	0	0	4,455	750	3,341,250
£1,000 to £3,000 ..	3	0	0	9,459	0	0	3,153	1,500	4,729,500
£3,000 „ £5,000 ..	4	0	0	1,336	0	0	334	3,500	1,169,000
£5,000 and upwards..	5	0	0	1,265	0	0	253	5,500	1,391,500
				33,689	7	6	27,900	519	14,488,910

"The amount paid by Life Insurance Associations in Great Britain and Ireland averages (it is considered) between 2 and 3 millions sterling per annum for claims on Life Policies alone; £2,500,000 per annum is perhaps as near an estimate as can be made. The Equitable Society alone, in the year 1849, paid in claims on life policies £337,146, and in additions to claims £275,670, making a total of £612,816. When to this are added the large amounts annually paid by such institutions as The Rock, The London Life Association, Royal Exchange, Globe, Law, Atlas, Norwich Union, &c., and also by the greatly-increased number of more recent Offices, it will be evident that the total amount just named is by no means overstated. On consideration of the new impulse given to life insurance transactions, it may be assumed that the average age of the existing assured is not above 50 years, the accession of a large amount of new business having the effect of moderating the general standard of age. Taking the above as data upon which to compute the amount of existing insurances, let it be allowed that the 2½ millions sterling of policy claims arise from the mortality corresponding to the age of 50 among assured lives. Such rate of mortality may be fairly taken at 1⅔ per cent., or, in other words, that out of 60 insurances there is annually at that age *one claim*. Assume the claims to correspond in amount with the average sum insured by existing policies, then £2,500,000 multiplied by 60 gives the sum of £150,000,000 as the approximate amount insured."

"If £500 be the average of each policy, then their aggregate number is 300,000; and taking 4 policies to every 3 *lives*, then £666. 13*s*. 4*d*. is the average on each life, and 225,000 the number of lives assured."

Fire.—In Fire Insurance a better estimate can be made, from the amount of duty given in Parliamentary Returns, the last of which was ordered to be printed 6th May, 1851.

The total duty received in 1850, in England, Scotland and Ireland, was £1,171,629. 16*s*., representing a sum insured of £781,086,533, besides £61,805,427 farming stock insured, which is exempt from duty, making a total of £842,891,960. This large amount of insurance is steadily on the increase. Since 1844 it has increased 12 per cent., or 2 per cent. per annum, and in the last two years at the rate of 2·785 per cent. per annum.

Maritime.—It is difficult to estimate the amount of Marine Insurances in Great Britain. Besides the five large Marine Companies, which do not publish reports, there must be taken into account the vast amount of assurance in this branch of business by the underwriters at Lloyds', and a great number of small local Societies in different ports, principally confined to the mutual insurance of vessels and cargoes in the coasting trade. When some discussion in the House of Commons took place, in 1810 and 1811, respecting marine insurances, the total amount insured, computed from the duty paid, was estimated at nearly £200,000,000; the proportion of duty for the Irish and coasting trade being set down at about one-fifth of that for foreign insurance. The answers to inquiries recently instituted are very various,—from £150,000,000 up to £300,000,000. Of this sum the amount insured in the five great Companies is computed at about £70,000,000, and the average premium about £1. 12*s*. per cent., which would give their income from premiums about £1,120,000 per annum.

Other Branches.—Much attention has lately been paid to the extension of other branches of insurance against the risks of hail, of the mortality of cattle, accidental death, guarantee of fidelity, &c. Even in the insurance of cattle, one Company has, in less than six years, issued nearly 40,000 agreements, and paid losses to the amount of £300,000. Another Company has, in the insurance against railway accidents, in six months ending June last, issued upwards of 122,000 tickets, either periodical or for a single journey.

At the beginning of 1850 there were no less than 207 Companies for various branches of assurance, and of 121 of these, the guaranteed nominal capital was computed at nearly £93,000,000.

FRANCE.—*Fire.*—The progress of Fire Insurance in France has been most remarkable. The earliest of the existing Proprietary Companies was only established in 1819; yet the amount of Fire Insurance in force, during the year 1850, in the 13 Proprietary Companies alone, was £1,038,433,800. Including the 41 Mutual Companies, it is computed by M. Dubroca, that the total amount of Fire Insurance in France exceeds £1,318,000,000, the premiums upon which would be about £1,120,000, and the losses in the year about £565,000.

Life.—Life Assurance in France has not yet been so actively pressed. Three or four of the old Proprietary Companies assure sums payable on death, but the largest business is in the Mutual Tontine Associations for the assurance of sums payable after fixed periods. Up to the end of 1850, the number of subscriptions of this kind in the 18 Companies authorized by Government had been 409,493, for the total amount of £16,593,550; and the payments received and invested in Government Funds amounted at that time to £5,759,218, producing an annual income of £271,902.

Maritime.—The Maritime Insurances of France are increasing. M. le Capitaine Lafond, an able writer on this subject, considers that the present amount insured in Paris and in the Ports of France cannot be less than £50,000,000. In 1835 the total was reckoned to be about £40,000,000.

Other Risks.—In the south of France several Companies exist for hail insurance. There are other Companies also in that country for the risks of mortality amongst cattle, accidental death, for substitutes for military service, and even to insure against the costs of law proceedings.

In 1846 the total number of French Assurance Companies of various kinds was about 100.

GERMANY.—Herr Masius, in a publication which has been commenced at Leipsic within a few months, and who, from having conducted for 4 years a journal devoted to assurance matters, is intimately acquainted with the best information on the subject, gives the following summary of the present amount of assurances of various kinds in Germany:—

About	£286,000,000	against the risks of fire by Proprietary Companies.
„	100,000,000	„ „ Mutual Companies.
„	429,000,000	„ „ Municipal Associations assuring only immoveable property.
Total..	£815,000,000	against fire.
	100,000,000	„ accidents by land and sea.
	9,000,000	on lives and reversions.
	1,400,000	on life annuities.
	11,400,000	against hail.
	200,000	„ the mortality of cattle.
Grand total..	£937,000,000	

In the returns to 31st December 1849, which have been sent to us by Herr Rath G. Hopf, manager of the leading Company for fire and life assurance at Gotha, the sums insured against fire, in 6 Proprietary and 1 Mutual Company, amounted to more than £213,700,000, besides £42,240,000 in one of these Companies against the risks of transport of goods. The annual premiums received in the year were upwards of £460,000.

The amount of life assurance in Germany, existing at the end of 1850, in 7 Companies, is given as very nearly £6,100,000, amongst 31,936 persons assured, producing in premiums and interest on capital, &c., £274,858; and if the latest returns of 5 other Companies, to about the end of 1849, be added, the total assured in the 12 Companies would be at least £7,379,000, the premiums on which, and receipts from other sources of income in the year, amounted to £335,000.

In Hamburgh the marine insurances, in 1850, amounted to £23,451,000, and the premiums thereon to £365,500.

HOLLAND.—In this country very little information is given as to the position or revenue of the Assurance Companies. The existing Companies are 142 in number, but many of them are of small importance: the principal are those for marine insurance, which the former commerce of Holland, and her carrying trade by ships, naturally gave rise to. The principal Society for fire, life, and annuities combined is the East Indian Society of Administration and Annuities; and for life assurance only, the Dutch Life Assurance Society.

In BELGIUM there are 19 principal Companies, one or two assuring largely on lives or against fire risks.

In 10 of the Fire Insurance Companies the amount insured, in 1849-50, was £121,419,190; the premiums in the year were £129,724, and the losses £56,000.

In 1848, in the report made by the Minister of Finance in Belgium on the question whether the Government should undertake assurance generally, it is stated that the number of Proprietary Assurance Companies in Belgium authorized since 1830 is 12, of which 8 only were carrying on business at the date of the report. The total amount assured in 7 of these Companies was more than £57,000,000.

At Antwerp the amount insured in 10 Marine Companies, in 1847-8, was upwards of £2,800,000, and the premiums received about £61,400. M. Flemmich, of Antwerp, considers the amount now insured equals £3,200,000.

In RUSSIA and in RUSSIAN POLAND there are several Assurance Companies both for fire and life. The insurance of buildings by the Government in Poland against fire amounts to nearly £16,000,000; but of the Companies at St. Petersburgh I can only at present give the returns of one, which, in 20 years to 1847, had insured on an average £14,662,000 per annum.

AMERICA.—A very rapid extension of life and fire assurance is taking place in this country. In two Life Assurance Companies only, the amount computed by Professor Gill, the actuary of one of these Companies, to be assured is £6,600,000. In the State of Massachusetts the official return gives the capital of 18 Proprietary Companies in Boston as £991,375, and of 12 Offices out of Boston as £230,000; and the sums at risk in both combined, on 1st December, 1850, as £15,216,500 in marine, and £12,788,600 in fire insurances. In the Mutual Companies in the same State, the amount insured during the year against marine risks was £7,784,000, and fire risks £2,598,000.

In New York, Boston, and Philadelphia there are altogether no less than 116 Companies engaged in the different branches of assurance.

These few statistics—though they form only an imperfect sketch, which I hope hereafter to fill up from equally authentic sources of information—will serve to give some idea of the importance and rapid growth of the system. I will merely conclude with the remark, that the principles of assurance appear to spread more rapidly where Governments do not undertake the management of the business, but leave it, under general regulations, to the free action and enterprise of private Companies, and the voluntary support of the public.